

1 What is claimed is:

2 1. A door condition sensor for a chamber having an entry
3 door and a door frame therefor comprising:

4 a. a sensor housing adaptable for mounting on an inside
5 surface of the door;

6 b. frame engageable means for abutting the door frame when
7 the door is completely closed, the frame engageable means
8 being slideably mounted in the sensor housing and confined to
9 linear displacement therein;

10 c. rotatable driver means rotatably mounted in the sensor
11 housing at a fixed axial location therein, the rotatable
12 driver means being rotatably driven by the frame engageable
13 means, the rotatable driver means for transforming linear
14 displacement of the frame engageable means into corresponding
15 rotational orientation of the rotatable driver means;

16 d. analog signal generator means mounted in the sensor
17 housing having a rotatable part driven by the rotatable driver
18 means and having an axis coinciding with the fixed axial
19 location in the sensor housing, the analog signal generator
20 means for producing analog signals corresponding to the
21 rotational orientation of the rotatable part of the analog
22 signal generator means; and

23 e. biasing means for extending a part of the frame
24 engageable means away from the sensor housing and for

1 maintaining the frame engageable means against the door frame
2 when the door is completely closed.

3 2. The door condition sensor of claim 1, further comprising
4 fastening means for fastening the sensor housing to the
5 inside surface of the door.

6 3. The door condition sensor of claim 1, wherein the analog
7 signal generator means includes a potentiometer.

8 4. The door condition sensor of claim 1, wherein the frame
9 engageable means has a ramp-shaped leading surface for
10 striking and abutting a jamb of the door frame as the
11 door is closed, so that frame engageable means is easily
12 displaced into the sensor housing.

13 5. The door condition sensor of claim 1,
14 wherein the rotatable driver means is a segmented
15 gear having outwardly extending gear teeth, and
16 wherein the frame engageable means has a linear set
17 of complementary gear teeth inwardly extending for
18 engaging the outwardly extending gear teeth of the
19 rotatable driver means.

20 6. The door condition sensor of claim 1, wherein the biasing
21 means is coil extension spring.

- 1 7. The door condition sensor of claim 6, wherein the sensor
2 housing has a channel for holding a portion of the coil
3 extension spring when the door is completely open, and
4 for holding approximately the entire coil extension
5 spring when the door is completely closed.
- 6 8. The door condition sensor of claim 7, wherein the frame
7 engageable means has a prong for axial insertion into one
8 end of the coil extension spring for maintaining the coil
9 extension spring in a straight line at all extensions of
10 the frame engageable means from the sensor housing.
- 11 9. The door condition sensor of claim 1, wherein the biasing
12 means is also for maintaining the frame engageable means
13 against a part of the door frame when the door is nearly
14 closed.
- 15 10. The door condition sensor of claim 1, further comprising
16 a housing cover removably attached to the sensor housing
17 for confining a portion of the frame engageable means
18 within the sensor housing and the housing cover, and for
19 maintaining a slidable linear relationship of the frame
20 engageable means relative to the sensor housing.

- 1 11. The door condition sensor of claim 10, wherein the
2 housing cover includes means for preventing the frame
3 engageable means from being completely removed from the
4 sensor housing.
- 5 12. The door condition sensor of claim 10,
6 wherein the frame engageable means has a linear stop
7 slot, and
8 wherein the housing cover has an internal stop
9 positioned within the linear stop slot, the linear stop
10 slot and internal stop for confining the linear movement
11 of the frame engageable means between approximately a
12 closed-door position and an opened-door position.
- 13 13. The door condition sensor of claim 10, further comprising
14 fastening means for securing the housing cover to the
15 sensor housing.
- 16 14. The door condition sensor of claim 1, further comprising
17 conversion means for converting analog signals from the
18 analog signal generator means to corresponding digital
19 signals.
- 20 15. The door condition sensor of claim 14, wherein the
21 corresponding digital signals are proportional to linear
22 displacement of the frame engageable means.

- 1 16. The door condition sensor of claim 14, further comprising
2 means for receiving the digital signal from the
3 conversion means, and for converting the digital signal
4 to a distance parameter indicative of present extension
5 of frame engageable means relative to the sensor housing.
- 6 17. The door condition sensor of claim 16, further comprising
7 means electrically linked to the door condition sensor,
8 for entering a preset set point corresponding to a
9 distance that the frame engageable means is extended when
10 the door is completely closed.
- 11 18. The door condition sensor of claim 17, further comprising
12 means for entering a tolerance for an acceptable
13 deviation from the preset set point thereby defining a
14 preset set point range.
- 15 19. The door condition sensor of claim 18, further comprising
16 a tampering alarm, means for identifying a door closing
17 that is not normal and thereby may indicate a tampering
18 or a compromising of security of the chamber, and means
19 for activating the tampering alarm in event of said
20 tampering or comprising.

- 1 20. The door condition sensor of claim 18, further comprising
2 a tampering alarm, means for identifying non-normal
3 displacements of the frame engageable means that are not
4 within the preset set point range, and means for
5 activating the tampering alarm in event of the non-normal
6 displacements.
- 7 21. The door condition sensor of claim 20, further comprising
8 means for time stamping each occurrence of an activation
9 of the tampering alarm.
- 10 22. The door condition sensor of claim 21, further comprising
11 means for producing a retrievable chronological record of
12 each time stamping.
- 13 23. The door condition sensor of claim 14, further comprising
14 a time alarm, and means for entering an allowed open
15 period for the door to be open and for activating the
16 time alarm when lapsed time that the door remains open
17 exceeds the allowed open period.
- 18 24. The door condition sensor of claim 23, further comprising
19 means for time stamping each occurrence of an activation
20 of the time alarm.

1 25. The door condition sensor of claim 24, further comprising
2 means for producing a retrievable chronological record of
3 each time stamping.

4 26. A door condition sensor for a chamber having an entry
5 door and a door frame therefor comprising:

6 a. a sensor housing adaptable for mounting on an inside
7 surface of the door;

8 b. frame engageable means for abutting the door frame when
9 the door is completely closed, the frame engageable means
10 being slideably mounted in the sensor housing and confined to
11 linear displacement therein;

12 c. rotatable driver means rotatably mounted in the sensor
13 housing at a fixed axial location therein, the rotatable
14 driver means being rotatably driven by the frame engageable
15 means, the rotatable driver means for transforming linear
16 displacement of the frame engageable means into corresponding
17 rotational orientation of the rotatable driver means;

18 d. analog signal generator means mounted in the sensor
19 housing having potentiometer with a rotatable part driven by
20 the rotatable driver means and having an axis coinciding with
21 the fixed axial location in the sensor housing, the analog
22 signal generator means for producing analog signals
23 corresponding to the rotational orientation of the rotatable
24 part of the analog signal generator means;

1 e. a spring for extending a part of the frame engageable
2 means away from the sensor housing and for maintaining the
3 frame engageable means against the door frame when the door is
4 completely closed; and
5 f. a housing cover removably attached to the sensor housing
6 for confining a portion of the frame engageable means within
7 the sensor housing and the housing cover, and for maintaining
8 a slidable linear relationship of the frame engageable means
9 relative to the sensor housing.

10 27. The door condition sensor of claim 16, further comprising
11 conversion means for converting analog signals from the
12 analog signal generator means to corresponding digital
13 signals that are proportional to linear displacement of
14 the frame engageable means.